Problem D. The Easiest One

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

Given an nonnegative integer x, Chiaki can perform the following two operations:

1. Obtain $x - 1$ from x.
2. Obtain $x - 2^i$ from x, if x AND 2^i is not 0.

Here, a AND b is the bitwise AND of a and b. The operations may be performed any number of times in any order.

Let $f(x, y)$ be the minimum number of operations needed to change x to y. For a given number n, Chiaki would like to know the value

$$\sum_{0 \le y \le x \le n} f(x, y).$$

Input

There are multiple test cases. The first line of the input contains an integer T, indicating the number of test cases. For each test case:

The first line contains an integer n in binary representation ($0 \le n < 2^{500}$) without leading zeros.

It is guaranteed that the sum of lengths of the binary representations of n over all test cases will not exceed 500.

Output

For each test case, output the answer modulo $(10^9 + 7)$.

Example

standard input	standard output
10 0 1 10 11 100 101 110 111 1000 1001	0 1 3 7 13 22 31 43 60 83